INSTALLATION, OPERATION AND MAINTENANCE MANUAL

90% EFFICIENCY AIR TO AIR HEAT RECOVERY UNIT

SERIES *RKS*

CE

Dear Customer,

Thank you for having purchased an LMF product. It is the result of many years of experience, research and has been made with top quality materials and highly advanced technologies. The CE mark guarantees that the machine meets the European Standards regarding safety.
The qualitative level is kept under constant surveillance. LMF products therefore offer SAFETY, QUALITY and RELIABILITY.

Thank you once again for your preference.

The manufacturer declines all responsibility for any inaccuracies in this manual due to printing or typing errors.
The manufacturer reserves the right to modify the products contents in this catalogue without previous notice.

DECLARATION OF CONFORMITY

The Legal Representative of LMF S.p.A., located in Meledo di Sarego, via Paradiso 33 (Vicenza- ITALY), declares that the unit belonging to **RKS** series complies to the prescriptions of the Machine Directive 2006/42/CE, Low Voltage Directive 2006/95/CE, EMC Directive 2004/108/CE and Ecodesign Directive 2009/125/CE.
The unit belonging to the above series is designed according to the following main safety prescriptions:

- principals of safety integration;
- used materials free from risk;
- safety while transportation, handling and installation;
- protection against mechanical risks;
- protection against electrical risks;
- protection against fire risks;
- design and construction done so that noise emission is reduced to minimum level;
- protection against the risk to remain trapped inside the machine;
- CE indelible marking complete with the needed indications;
- supply of an "User manual"

DECLARATION OF INCORPORATION
(Directive 2006/42/CE – Annex II paragraph B)

Moreover, the Legal Representative of LMF S.p.A. declares that the above machine shall be correctly installed and used and the system itself that integrates the machine shall be certified according to the prescriptions of the above Machine Directive 2006/42/CE.

Finally, he declares that the physical person authorized to the management of the Technical File is Mr. Michele Mattiolo, c/o LMF S.p.A., via Paradiso 33, Meledo di Sarego (Vicenza - ITALY).

Meledo di Sarego (VI)

The Legal Representative

SYMBOLOGY	
	ATTENTION
	DANGER
	HIGH RISK OF ELECTRIC SHOCK
	ATTENTION: AUTHORIZED PERSONNEL ONLY

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1 - INTRODUCTION

Dear Customer,

these heat recovery units are designed and developed for residential and commercial applications and allow the room air renewal with a sure energy saving.
In fact, where the room air renewal is needed, the unit transfers heat between the exhaust air to the fresh air that otherwise would be lost.

In their basic working principle, they consist in (see **figure 1**) :
1 – fans (supply and exhaust air)
2 – counterflow heat recovery
3 – filter sections (on fresh air and return air intakes)
4 – electrical board

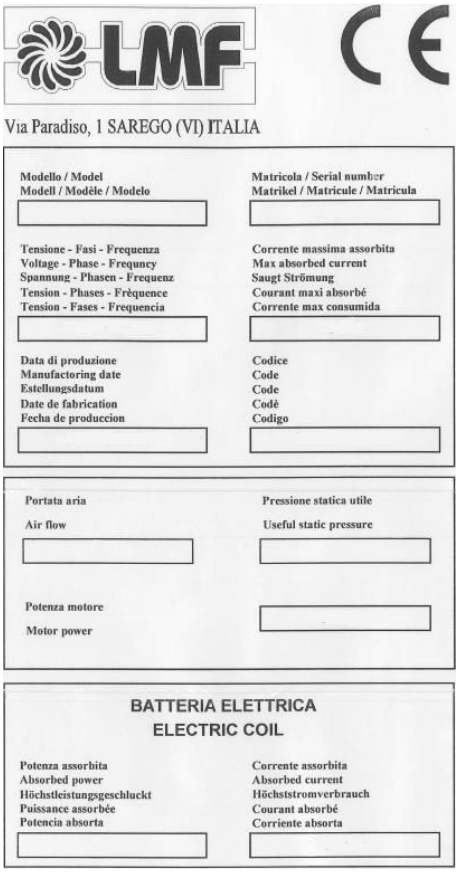
These units may be integrated with traditional heating and cooling systems, but they can operate also autonomously if equipped with the proper accessories.

• This manual and the wiring diagram supplied with the unit must be kept in a dry place and ready to hand for future consultation when required.
• This manual has been compiled to ensure that the unit is installed in the correct way and to supply comprehensive information about how to correctly use and service the appliance. **Before proceeding with the installation phase, please carefully read all the information in this manual, which describes the procedures required to correctly install and use the unit.**
• Strictly comply with the instructions in this manual and conform to the current safety standards.
• The appliance must be installed in accordance with the laws in force in the country in which the unit is installed.
• Unauthorized tampering with the electrical and mechanical equipment will **VOID THE WARRANTY.**
• Check the electrical specifications on the identification plate before making the electrical connections. Read the instructions in the specific section where the electrical connections are described.
• If the unit must be repaired for any reason, this must only be done by a specialized assistance center recognized by the manufacturer and using genuine spare parts.
• The manufacturer also declines all liability for any damage to persons or property deriving from failure of the information in this manual to correspond to the actual machine in your possession.
• Proper uses: this series of air to air heat recovery unit is designed to air renewal/conditioning purposes. Any use differing from this proper use or beyond the operating limits indicated in this manual is forbidden unless previously agreed with the manufacturer.
• The prevention of the risk of fire/injury at the installation site is the responsibility of the end user and/or installer.

Verify, upon acquisition, that the apparatus is complete and supplied as described.
Any eventual disputes must be presented in writing within 8 days from the reception of the goods.

Each unit is provided with identification plate listing the following:

- Address of Manufacturer
- “CE” Mark
- Model
- Serial Number
- Power supply voltage in “V”
- Power supply frequency in “Hz”
- Number of phases indicated with “Ph”
- Maximum current in “A”
- Date of fabrication
- Code
- Motor power “W”
- Absorbed power “kW” of electric coil (if present)
- Absorbed current “A” of electric coil (if present)

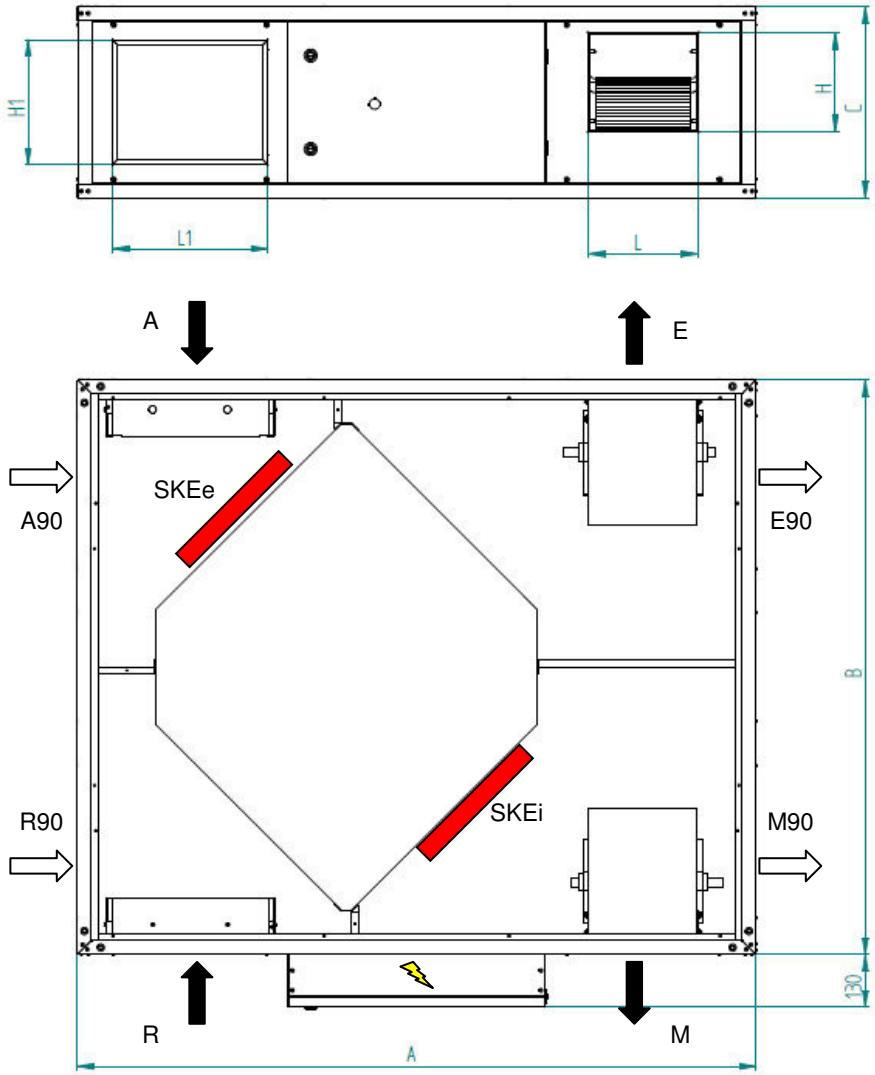


2 – DIMENSIONS, WEIGHTS, CONFIGURATIONS AND FLOW DIRECTIONS

Packing dimensions

According to the air duct lay-out, it is possible to rotate adequately the RKS 3V unit air inlets and outlets to give the following combinations, each of them is a specific unit orientation to be specified when ordering.

The following table, referred to the **figure**, shows the characteristic dimensions of the horizontal series RKS.

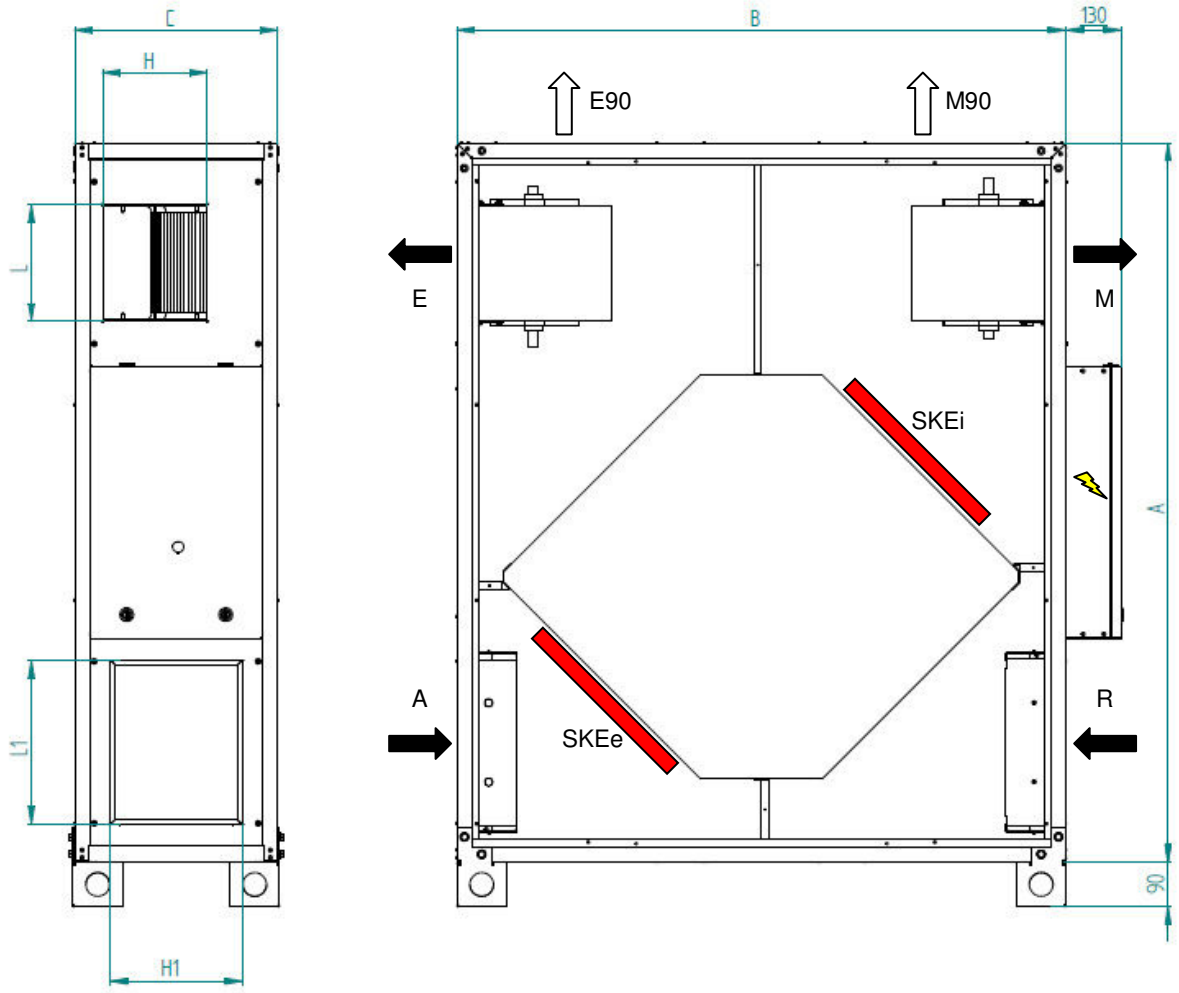


RKS	10	14	25	40
A (mm)	1175	1450	1700	1700
B (mm)	900	1230	1350	1350
C (mm)	410	410	490	630
L (mm)	217	235	235	235
H (mm)	110	210	210	210
L1 (mm)	331	331	502	502
H1 (mm)	268	268	347	487
Weight (kg)	80	120	175	220

M= supply air R=return air A= fresh air E= exhaust air = electrical connection

The following table, referred to the **figure**, shows the characteristic dimensions of the vertical series RKS/V.

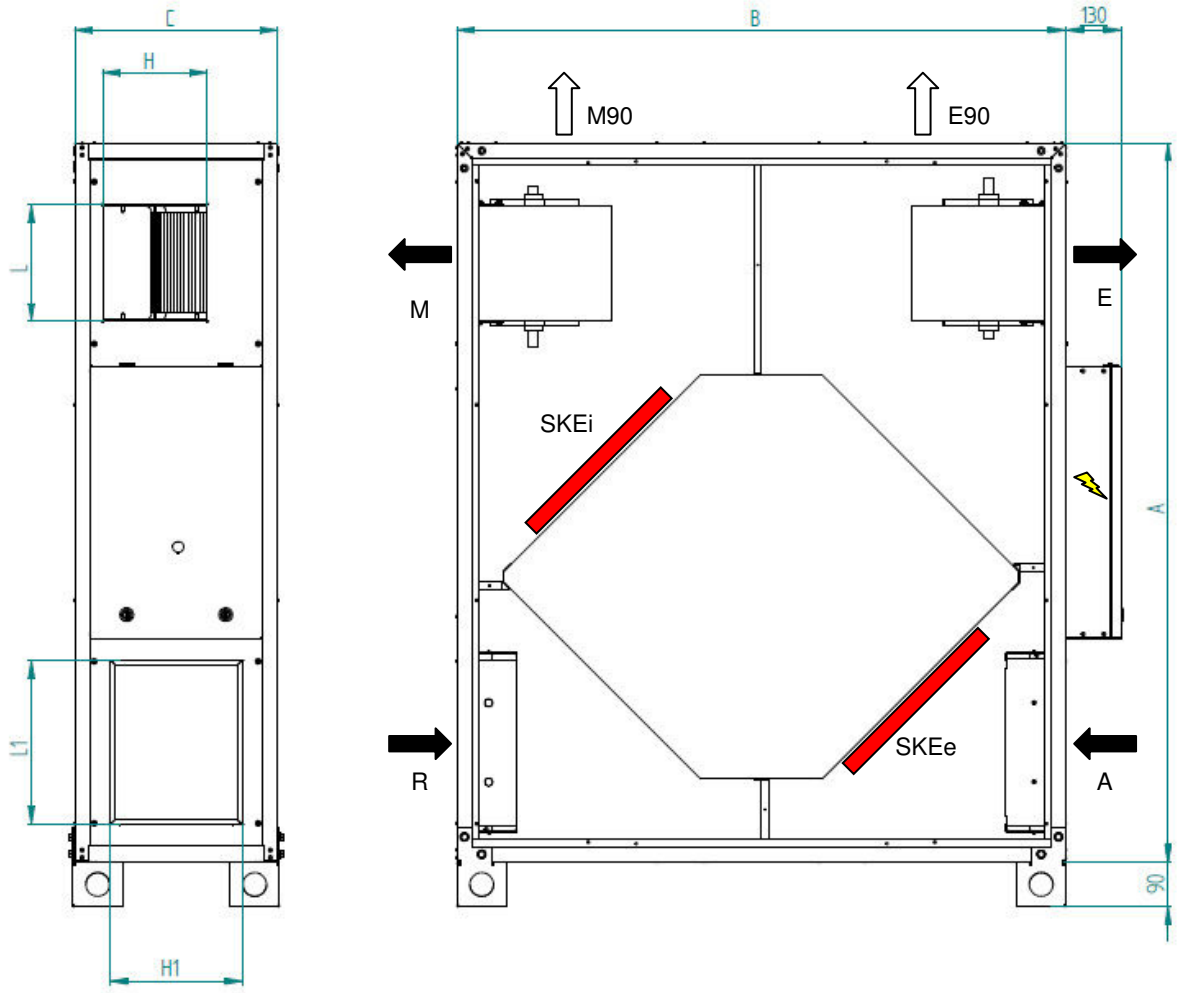
TYPE "A"



RKS/V	10	14	25	40
A (mm)	1175	1450	1700	1700
B (mm)	900	1230	1350	1350
C (mm)	410	410	490	630
L (mm)	217	235	235	235
H (mm)	110	210	210	210
L1 (mm)	331	331	502	502
H1 (mm)	268	268	347	487
Weight (kg)	80	120	175	220

M= supply air R=return air A= fresh air E= exhaust air = electrical connection

TYPE “B”



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Weight (kg)	80	120	175	220

M= supply air R=return air A= fresh air E= exhaust air = electrical connection

To modify the position of the suction inlets it is sufficient to exchange two panels each other.

3 – TRANSPORTATION, HANDLING AND STORAGE

Packaging

Each unit is put on bench and protected with cellophane film; the protection must remain intact until the moment of installation.
The materials that are not mounted for technical motives are supplied in fitted packing fixed externally or internally to the unit.
Recycle and dispose of packing material in conformity with local regulations, be extremely careful not to damage the unit.

Handling

Comply with the current safety regulations concerning the equipment to use when handling the unit or the required ways of operating. Use single protection devices as goggles, gloves, helmets… when handling the unit to avoid risk of injuries.

For the lifting and transportation of the unit, use adequate equipment, according to the 89/391/CEE regulations and further modifications.
Each individual unit weight is listed in this manual.
While moving, try to avoid rotation without control.

Check the weight of the unit before proceeding with the moving and handling operations. Make sure that the appliance is handled with care and without jolting as rough treatment could damage the functional parts
of the machine. To safeguard persons and property, read the information on the packing that covers the unit before handling.
Also make sure to:
• Handle the machine with care
• Do not stack other objects on top of the unit

Before positioning please consider the overall dimensions and the technical space requirements of the system and the unit, electric and hydraulic connections and any air pipes/ducts or free passages.
Neglecting these aspects may decrease performance and operational life of the unit and therefore increase the operating costs and maintenance.
Units are designed to be installed **INSIDE** or **PARTIALLY OUTSIDE** and in fixed positions.

Before placing the unit be sure that:
• the location is in a safe accessible place
• the framework or the floor or ceiling is adequate to support the weight of the unit, please refer to weight paragraph
• support points are leveled and aligned
• the place can not be subject to flooding
• the maximum level of the snow does not obstruct the airflow to the unit

To ensure the best air circulation to the unit and thus ensure a smooth operation it is recommended to:
• avoid obstructions to air flow near or above the unit
• protect the unit from high winds that can favor or not the airflow
• protect the unit from heat sources or pollutants (chimneys, extractors…)
• protect the unit from air stratification or recirculation (avoid bad ducting of the fans, containment structure, high walls or corners next to the unit)
These advises if not respected can lead to a lower efficiency of the unit and possible failures.

Checklist

Upon reception of the unit, we suggest that a complete control is carried out, to verify that the unit is intact and complete, and no damage has been sustained during transport. Any eventual damage revealed must be communicated to the carrier, demonstrating the reserve clause within the transport documents, specifying the type of damage.

Storage

The units must be stored in a dry place, sheltered from the sun, rain, sand and wind.
Comply with the storage conditions given below:

• Do not stack the units
• Maximum temperature = 60°C
• Minimum temperature = -20°C

The Manufacturer declines any responsibility for any damage as a result of negligence or lack of protection from atmospheric agents.

4 – INSTALLATION & CONNECTIONS

Definitions

CUSTOMER – The Customer is the person, activity or the society, that has bought or hired the unit, and intends to utilize the machinery for its intended use.

USER / **OPERATOR** – The User or Operator is the actual person that has been authorized by the Customer to utilize the unit.

QUALIFIED PERSONNEL - Defined as the person who has followed a relevant specific course of study, and so is able to understand the dangers derived from the use of the machinery, and in turn, due to this, are capable of solving major dilemmas.

Safety regulations

The Manufacturer declines any responsibility for failure to respect the Safety Regulations and the prevention as described below.
Furthermore, the Manufacturer declines any responsibility for damage caused by the improper use of the unit and/or modifications carried out without proper authorisation.

- **Qualified personnel must carry out the installation.**
- During the installation operation, use protective clothing, for example: glasses, gloves, etc. as indicated by 686/89/CEE and successive regulations.
- During the installation operate in absolute security, pollution free air and in an area free of obstructions.
- Respect the regulations in force in the country in which the apparatus is being installed. Specifically relative to its use, and to the disposal of packing and products used for the cleaning and maintenance of the unit. Respect the recommendations given by the producers of such products.
- Before placing in function the unit, check the perfect connection of the various components and the internal parts of the system.
- Avoid at all costs human contact with moving parts and contact with the parts themselves.
- **Do not commence with servicing or cleaning of the unit, before the unit has been disconnected from the main supply.**
- The maintenance and the substitution of damaged or consumed parts must be carried out only by specialized personnel, following the indications found within this manual.
- Spare parts must correspond to the requirements specified by Manufacturer.
- In case of dismantling of the unit**,** respect the anti-pollution regulations in force.

N.B. The installer and the user of the apparatus must take into account, and solve problems, connected with any other type of risk that may occur to the unit. For example, risks derived from the entrance of foreign bodies, or risks due to the presence of flammable or toxic gas.

Preliminary operations

- Check the perfect condition of the various components of the unit.
- Control that contained within the packing, there are the installation accessories, and documentation.
- Transport the packed section as close as is possible to the intended place of installation.
- Do not place tools or weight on top of the packed unit.

Choosing place of installation

- Position the unit on a solid structure, that will not vibrate, and is capable supporting the weight of the machine.
- Position the unit in a point where the condensation discharge may occur easily.
- Do not position the unit in an area in which flammable gases, acidic or corrosive substances are present. They may damage various components in an irreparable manner.
- Allow a minimum amount of free space as indicated in the **figure 6**. This permits ease of installation and maintenance.

Machine positioning

The unit is equipped with anti-vibration support plates.
Referring to the **figure 7**, the following are instructions to fix the unit to its supports :

1. Carry out the drilling of the ceiling, and fit the four M8 threaded bolts (1).
2. Position the unit on the four bolts using the supplied fixing plates (6).
3. Insert antivibrating (2), washer (3) and screw nut (4) and lock nut (5) without blocking.
4. Install the unit with 3 mm inclination towards the condensate outlet to aid the condensation going out.
5. Block the unit tightening the fixing bolts.

Air duct connections

IMPORTANT: IT IS IMPORTANT NOT TO PLACE IN OPERATION THE UNIT IF THE FAN OUTLETS ARE NOT DUCTED OR NOT PROTECTED BY A SAFETY NET ACCORDING TO THE ACTAUL REGULATION.

- The ducts must be the correct dimension based on the functions of system and the air diffusion characteristics of the unit fans.
- To prevent the formation of condensation and cut down the sound level it is advised to use internally lined ducts.
- To avoid the transmission of unit vibrations into the environment, it is advised to fit an antivibrating joint between the fans and ducts. The electrical continuity must be guaranteed between the ducts and the apparatus via an earth cable.

Water connections

The installation and connecting of the piping is an operation that must be done correctly, otherwise it may compromise the performance of the system. At worst it may cause irreversible damage to the machine. These operations are to be effectuated by **qualified personnel.**

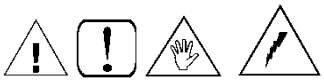
Condensation outlet connection

- The system of drainage must provide an adequate trap able to allow the condensation run off on under pressure conditions.
- The trap must be designed as shown on the **figure 8**
- The trap must have a tap for correct cleaning of the lower part, and must allow an easy disassembly.
- The path of the condensation drainage tube must always have a gradient toward external.
- Insure that the condensation run-off tube does not interfere with discharge of the unit.

Water coil connection (SAF)

- The water heating or cooling coil (SAF) is supplied with GAS “male” threaded headers.
- The tightening must be carried out with extreme care to avoid damage to the copper collectors of the coil.
- The path of the tubes must be studied in a way to avoid obstacles should it be necessary to extract the unit coil.
- Inlet and outlet water must consent the thermal exchange against the current. Follow instructions found on the WATER INLET and WATER OUTLET plate.
- Provide an air valve at the top of the unit, and a water discharge valve at the bottom.
- Reinforce sufficiently the units external tubes to avoid offloading the weight onto the coil.
- Once connection has been effectuated, fix the external seal flush against the control panel, in this way avoiding the passing of air.
- The insulation must not rest against the paneling, as this may provoke burning.
- For control purposes, organize the interception of the tube side coil when the fan is off, to avoid internal overheating and possible damage to internal components.

- Provide an anti-freeze system.
- Provide a cut out switch to isolate the coil from the rest of the circuit in case of extensive maintenance needs.
- Should the unit be installed in particularly cold areas, drain completely before plant shut-off long periods.



Electrical connections

Before starting any operation, insure that the general power supply has been isolated.
All the electrical connections must be protected at the source by the installer.

- Qualified personnel according to the supplied schemes must carry out the electrical connections at the control panel.
- Insure that the voltage and the frequency shown on the technical plate correspond to the connecting power supply.

Follow the connection of the unit and its accessories using adequate cabling for the power used, and respecting the country regulations. The dimensions of the cabling must be sufficient to support a voltage drop in start up phase inferior to 3% of the nominal.

- For the general power supply of the unit, and its accessories, the use of adapters, multiple plugs and extension leads is to be avoided.
- **It is the responsibility of the installer to insure that the installation of the unit is as close as possible to the mains power supply, or sufficiently close to protect the electrical parts.**
- Connect the unit to an efficient power point, using the correct screws as supplied with the unit.
- In the unit with relay board the screws of the connectors must be screwed with torx equal to 0,5 Nm

5 – WIRING DIAGRAMS

Follow diagram attached to every unit.

6 – STANDARD MAINTENANCE

BEFORE FOLLOWING ANY TYPE OF MAINTENANCE OPERATION, BE CERTAIN THAT THE UNIT MAY NOT CASUALLY OR ACCIDENTALLY BE CONNECTED TO THE ELECTRICAL MAINS SUPPLY. THERFORE IT IS NECESSARY TO SHUTDOWN THE UNIT'S POWER SUPPLY AD PRIOR TO MAINTENANCE.

- It is the responsibility of the User to carry out all types of maintenance operations.
- Only personnel previously trained and qualified may carry out maintenance operations.
- Should the unit require disassembly, hand protection is required

Maintenance is of extreme importance if the plant is to operate in a regular way and give fade-free service. Have maintenance work done by qualified and authorized personnel, according to EU Regulation 303/2008 of 2 April 2008 (and later) that requires companies and technicians that perform maintenance / repair, leakage checking and recovery / recycling gases must be certified as required by local regulations. Comply with the safety precautions given in the relative section of this manual and take all the necessary precautions. The following information is only a guide for the end user.
Maintenance keeps unit efficiency, reduce the speed of deterioration over time and collect information and data to understand the efficiency of the unit and prevent failures. We suggest to prepare a booklet of installation according European legislation. Provide a machine book that allows you to track of the actions taken on the unit, so it will be easier to cadence adequately the various interventions and will facilitate a possible troubleshooting.
Please take note of: date, type of action, description of action, measurements performed, anomalies identified, alarms registered in the alarm history, etc. ...

Monthly maintenance

Air filters

Filter section can be entered through side removable panel as well as bottom turnable panel; following the **figure 12**, in the first case, filter removal is done by dismounting the side filter frame 1, in the second case, by dismounting the bottom filter frame 2.

For the cleaning, utilize a vacuum cleaner or wash with normal detergent and warm water, allow to dry well. Remember to assemble the filter before operating the unit; replace a new filter after max 3 cleaning cycles. In case of soft bag filter (option), replace it when dirty.

Condensation discharge

Remove side panel and clean, if necessary, the dirt and impurities that have formed in the condensation tray. Also check the efficiency of the trap.

Water coil

Check that the coil exchanger (optional) is clean and in perfect state to guarantee the normal levels of performance.

Direct expansion coil

Check that the coil exchanger (optional) is clean and in perfect state to guarantee the normal levels of performance.

Yearly maintenance

Check that all the electrical equipment, in particular the fixing of the electrical connections.
Check the tightness of all nut, bolts, flanges and hydraulic connections that the vibrations of the machine may have loosened.

7 – TROUBLESHOOTING

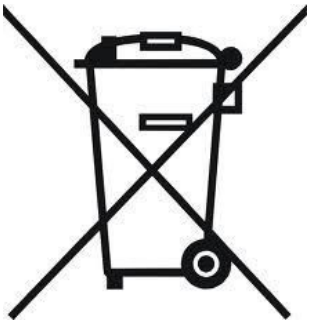
Failure searching and problem solving schedule

Founded failure	Probable cause	Possible solution
Fans are not running	• Power supply is switched off • No input signal to terminal 3 and/or 7 • Wrong or loose electrical connections • Motors on thermal protection mode	• Switch on the power supply • Give 0/10V signal to terminal 3 and/or 7, check GND wire is connected to terminal 4 and/or 8 • Restore the right connections • Check motor current and inverter led
Air performance decreasing	• Air filter dirty • Air duct blocked	• Clean or replace filter • Check air plant (are dampers open ?)
Condensate water stays inside the unit	• Condensate drainage blocked • Lacking or not adequate trap	• Clean or free the drainage • Install a right trap

8 – MATERIAL DISPOSAL

At the end of unit's lifetime, its components must be dismantled and disposed of respecting the operational regulations present in its country of installation.
The materials that the unit is constructed of are:

- Precoated sheet metal
- Zinc-plated sheet metal
- Aluminum
- Copper
- Polyester
- Polyethylene
- Mineral wool
- Stainless steel
- Plastic



During disconnection of the unit, avoid gas leakage or liquid spillage on environment, especially if the water has additives like glycol. For dismissing and disposal, deliver the units to specialized centers according to your national laws.

I

MANUALE INSTALLAZIONE, USO E MANUTENZIONE

RECUPERATORE DI CALORE ARIA-ARIA
EFFICIENZA 90%

SERIE *RKS*

CE

SIMBOLOGIA	
	ATTENZIONE
	PERICOLO
	RISCHIO DI SHOCK ELETTRICO
	ATTENZIONE: SOLO PERSONALE AUTORIZZATO

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1 - INTRODUZIONE

Gentile Cliente,
le unità di recupero calore ad altissima efficienza sono state progettate e realizzate per applicazioni di tipo residenziale, commerciale ed industriale per le quali, in abbinamento al ricambio dell'aria, sia richiesto un recupero di energia talmente spinto da rendere minimo o praticamente superfluo l'impiego di sistemi di post-trattamento termico dell'aria primaria.
Infatti, laddove sia richiesto o previsto il ricambio forzato dell'aria ambiente, l'unità provvede al trasferimento di circa il 90% del calore potenzialmente scambiabile tra flusso di aria esterna usata per il rinnovo e quello di aria viziata ripresa dall'ambiente ed inviata all'espulsione. Nella loro essenza, sono funzionalmente costituite (si veda **figura 1**) da :

1 – ventilatore (di immissione e di espulsione)
2 – recuperatore di calore a flussi in controcorrente
3 – sezione filtrante (su presa aria esterna e ripresa ambiente)
4 – sistema di controllo elettrico ed elettronico (opzionale)

Queste unità si possono integrare con sistemi di riscaldamento e raffrescamento tradizionali, ma posso anche operare autonomamente se equipaggiati con i necessari accessori.

• Questo manuale e lo schema elettrico forniti a corredo dell'unità devono essere custoditi in un luogo asciutto e a portat di mano per consultazioni future se richiesto.
• Questo manuale è stato compilato per garantire che l'unità venga installata nel modo corretto This manual has been compiled to ensure that the unit is installed in the correct way and to supply comprehensive information about how to correctly use and service the appliance. **Before proceeding with the installation phase, please carefully read all the information in this manual, which describes the procedures required to correctly install and use the unit.**
• Strictly comply with the instructions in this manual and conform to the current safety standards.
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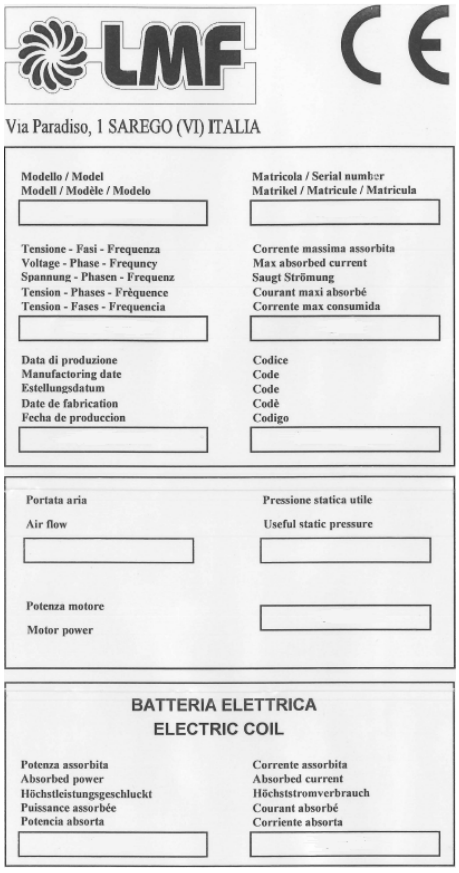
Verify, upon acquisition, that the apparatus is complete and supplied as described.
Any eventual disputes must be presented in writing within 8 days from the reception of the goods.

Ogni unità è dotata di una targhetta di identificazione che riporta:

- Indirizzo del costruttore
- Marchio CE
- Modello
- Numero di matricola
- Tensione di alimentazione in "V"
- Frequenza di alimentazione in "Hz"
- Numero di fasi di alimentazione in "Ph"
- Corrente massima assorbita in "A"
- Data di fabbricazione
- Codice
- Potenza motore in "W"
- Potenza elettrica in "kW" della resistenza elettrica (se presente)
- Corrente assorbita in "A" della resistenza elettrica (se presente)



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Packing dimensions

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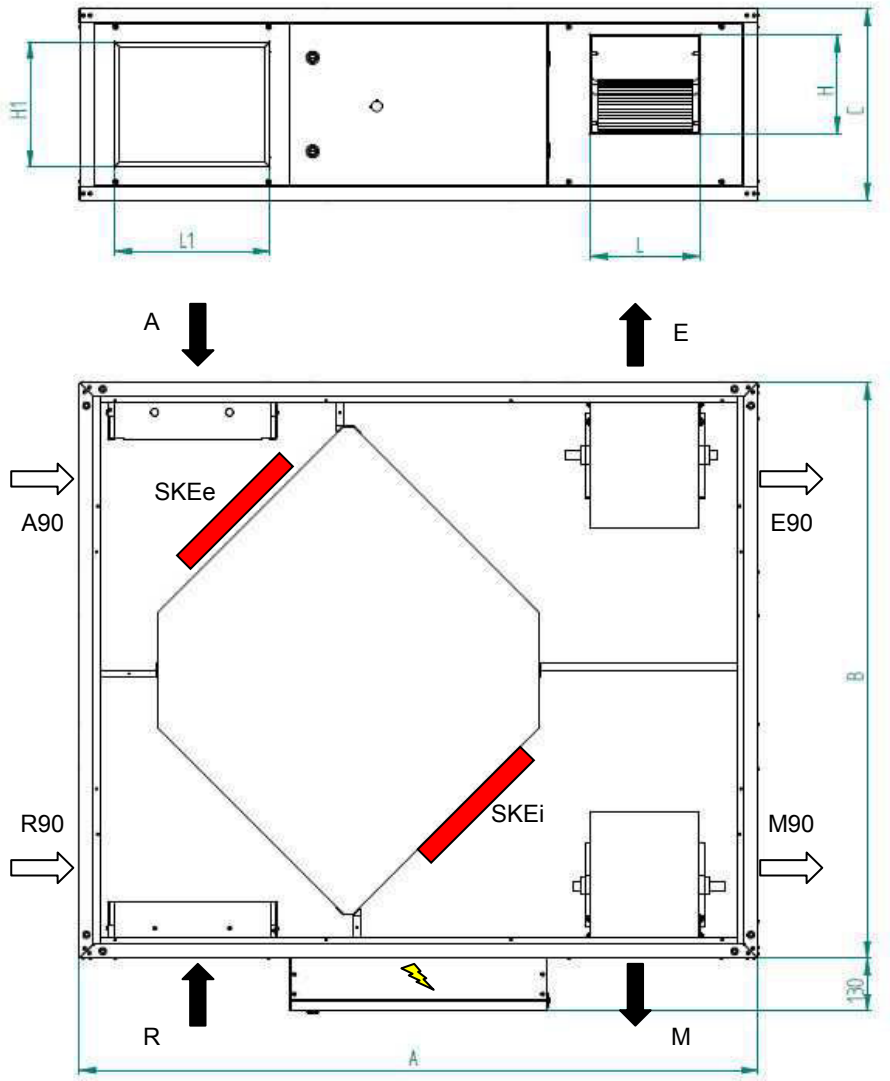

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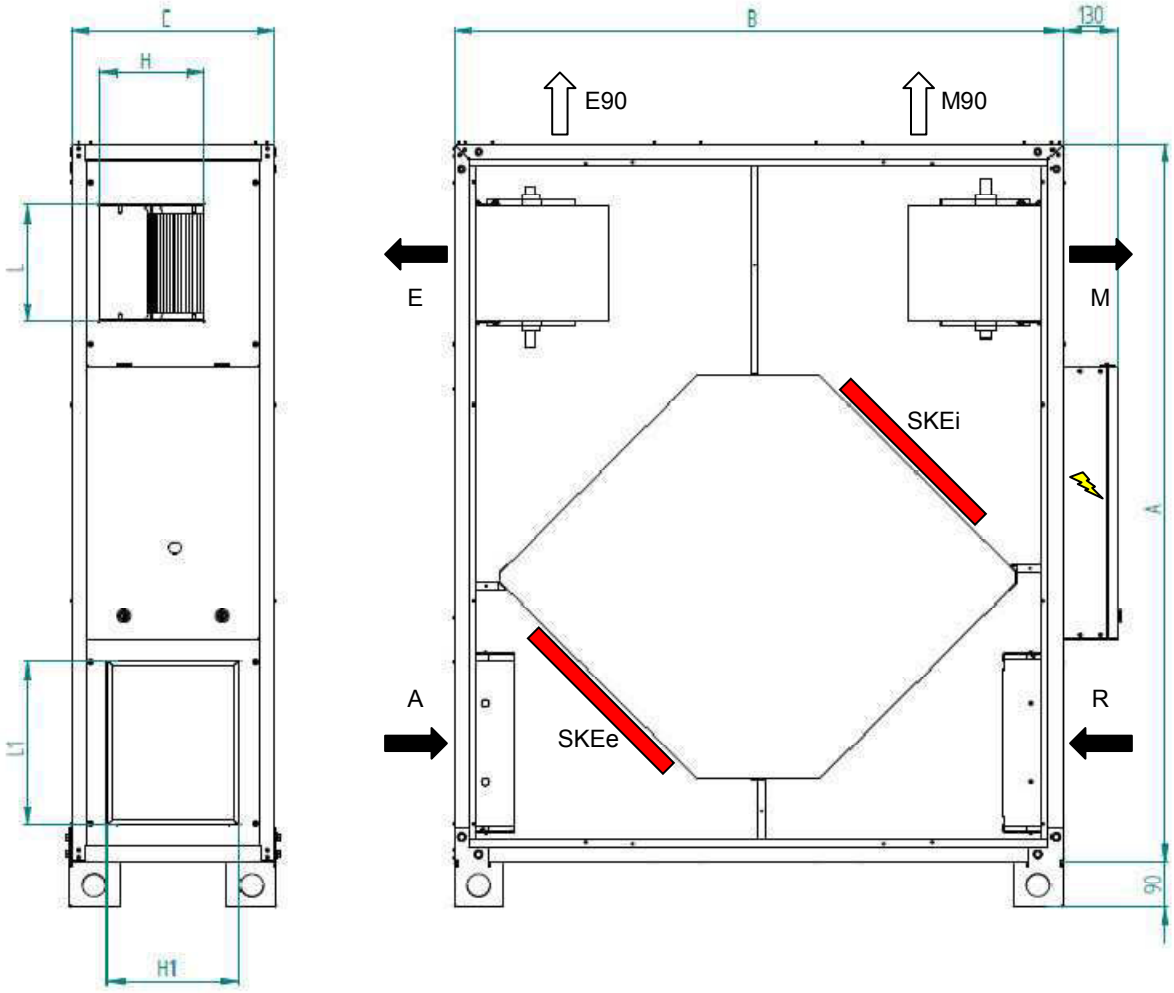
L1 (mm)	331	331	502	502
H1 (mm)	268	268	347	487
Weight (kg)	80	120	175	220

M= supply air R=return air A= fresh air E= exhaust air = electrical connection

The following table, referred to the **figure**, shows the characteristic dimensions of the vertical series RKS/V.



RKS/V	10	14	25	40
A (mm)	1175	1450	1700	1700
B (mm)	900	1230	1350	1350
C (mm)	410	410	490	630
L (mm)	217	235	235	235
H (mm)	110	210	210	210
L1 (mm)	331	331	502	502
H1 (mm)	268	268	347	487
Weight (kg)	80	120	175	220

M= supply air R=return air A= fresh air E= exhaust air = electrical connection

To modify the position of the suction inlets it is sufficient to exchange two panels each other.

3 – TRASPORTO, MANIPOLAZIONE E STOCCAGGIO

Packaging

Each unit is put on bench and protected with cellophane film; the protection must remain intact until the moment of installation.
The materials that are not mounted for technical motives are supplied in fitted packing fixed externally or internally to the unit.
Recycle and dispose of packing material in conformity with local regulations, be extremely careful not to damage the unit.

Handling

Comply with the current safety regulations concerning the equipment to use when handling the unit or the required ways of operating. Use single protection devices as goggles, gloves, helmets… when handling the unit to avoid risk of injuries.

For the lifting and transportation of the unit, use adequate equipment, according to the 89/391/CEE regulations and further modifications.
Each individual unit weight is listed in this manual.
While moving, try to avoid rotation without control.

Check the weight of the unit before proceeding with the moving and handling operations. Make sure that the appliance is handled with care and without jolting as rough treatment could damage the functional parts
of the machine. To safeguard persons and property, read the information on the packing that covers the unit before handling.
Also make sure to:
• Handle the machine with care
• Do not stack other objects on top of the unit

Before positioning please consider the overall dimensions and the technical space requirements of the system and the unit, electric and hydraulic connections and any air pipes/ducts or free passages.
Neglecting these aspects may decrease performance and operational life of the unit and therefore increase the operating costs and maintenance.
Units are designed to be installed **INSIDE** or **PARTIALLY OUTSIDE** and in fixed positions.

Before placing the unit be sure that:
• the location is in a safe accessible place
• the framework or the floor or ceiling is adequate to support the weight of the unit, please refer to weight paragraph
• support points are leveled and aligned
• the place can not be subject to flooding
• the maximum level of the snow does not obstruct the airflow to the unit

To ensure the best air circulation to the unit and thus ensure a smooth operation it is recommended to:
• avoid obstructions to air flow near or above the unit
• protect the unit from high winds that can favor or not the airflow
• protect the unit from heat sources or pollutants (chimneys, extractors…)
• protect the unit from air stratification or recirculation (avoid bad ducting of the fans, containment structure, high walls or corners next to the unit)
These advises if not respected can lead to a lower efficiency of the unit and possible failures.

Checklist

Upon reception of the unit, we suggest that a complete control is carried out, to verify that the unit is intact and complete, and no damage has been sustained during transport. Any eventual damage revealed must be communicated to the carrier, demonstrating the reserve clause within the transport documents, specifying the type of damage.

Storage

The units must be stored in a dry place, sheltered from the sun, rain, sand and wind.
Comply with the storage conditions given below:

• *Do not stack the units*
• *Maximum temperature = 60°C*
• *Minimum temperature = -20°C*

The Manufacturer declines any responsibility for any damage as a result of negligence or lack of protection from atmospheric agents.

4 – INSTALLAZIONE & CONNESSIONE

Definitions

CUSTOMER – The Customer is the person, activity or the society, that has bought or hired the unit, and intends to utilize the machinery for its intended use.

USER / OPERATOR – The User or Operator is the actual person that has been authorized by the Customer to utilize the unit.

QUALIFIED PERSONNEL - Defined as the person who has followed a relevant specific course of study, and so is able to understand the dangers derived from the use of the machinery, and in turn, due to this, are capable of solving major dilemmas.

Safety regulations

The Manufacturer declines any responsibility for failure to respect the Safety Regulations and the prevention as described below.
Furthermore, the Manufacturer declines any responsibility for damage caused by the improper use of the unit and/or modifications carried out without proper authorisation.

- **Qualified personnel must carry out the installation.**
- During the installation operation, use protective clothing, for example: glasses, gloves, etc. as indicated by 686/89/CEE and successive regulations.
- During the installation operate in absolute security, pollution free air and in an area free of obstructions.
- Respect the regulations in force in the country in which the apparatus is being installed. Specifically relative to its use, and to the disposal of packing and products used for the cleaning and maintenance of the unit. Respect the recommendations given by the producers of such products.
- Before placing in function the unit, check the perfect connection of the various components and the internal parts of the system.
- Avoid at all costs human contact with moving parts and contact with the parts themselves.
- **Do not commence with servicing or cleaning of the unit, before the unit has been disconnected from the main supply.**
- The maintenance and the substitution of damaged or consumed parts must be carried out only by specialized personnel, following the indications found within this manual.
- Spare parts must correspond to the requirements specified by Manufacturer.
- In case of dismantling of the unit**,** respect the anti-pollution regulations in force.

N.B. The installer and the user of the apparatus must take into account, and solve problems, connected with any other type of risk that may occur to the unit. For example, risks derived from the entrance of foreign bodies, or risks due to the presence of flammable or toxic gas.

Preliminary operations

- Check the perfect condition of the various components of the unit.
- Control that contained within the packing, there are the installation accessories, and documentation.
- Transport the packed section as close as is possible to the intended place of installation.
- Do not place tools or weight on top of the packed unit.

Choosing place of installation

- Position the unit on a solid structure, that will not vibrate, and is capable supporting the weight of the machine.
- Position the unit in a point where the condensation discharge may occur easily.
- Do not position the unit in an area in which flammable gases, acidic or corrosive substances are present. They may damage various components in an irreparable manner.
- Allow a minimum amount of free space as indicated in the **figure 6**. This permits ease of installation and maintenance.

Machine positioning

The unit is equipped with anti-vibration support plates.
Referring to the **figure 7**, the following are instructions to fix the unit to its supports :

1. Carry out the drilling of the ceiling, and fit the four M8 threaded bolts (1).
2. Position the unit on the four bolts using the supplied fixing plates (6).
3. Insert antivibrating (2), washer (3) and screw nut (4) and lock nut (5) without blocking.
4. Install the unit with 3 mm inclination towards the condensate outlet to aid the condensation going out.
5. Block the unit tightening the fixing bolts.

Air duct connections

IMPORTANT: IT IS IMPORTANT NOT TO PLACE IN OPERATION THE UNIT IF THE FAN OUTLETS ARE NOT DUCTED OR NOT PROTECTED BY A SAFETY NET ACCORDING TO THE ACTAUL REGULATION.

- The ducts must be the correct dimension based on the functions of system and the air diffusion characteristics of the unit fans.
- To prevent the formation of condensation and cut down the sound level it is advised to use internally lined ducts.
- To avoid the transmission of unit vibrations into the environment, it is advised to fit an antivibrating joint between the fans and ducts. The electrical continuity must be guaranteed between the ducts and the apparatus via an earth cable.

Water connections

The installation and connecting of the piping is an operation that must be done correctly, otherwise it may compromise the performance of the system. At worst it may cause irreversible damage to the machine. These operations are to be effectuated by **qualified personnel.**

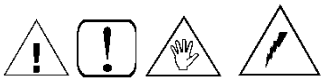
Condensation outlet connection

- The system of drainage must provide an adequate trap able to allow the condensation run off on under pressure conditions.
- The trap must be designed as shown on the **figure 8**
- The trap must have a tap for correct cleaning of the lower part, and must allow an easy disassembly.
- The path of the condensation drainage tube must always have a gradient toward external.
- Insure that the condensation run-off tube does not interfere with discharge of the unit.

Water coil connection (SAF)

- The water heating or cooling coil (SAF) is supplied with GAS “male” threaded headers.
- The tightening must be carried out with extreme care to avoid damage to the copper collectors of the coil.
- The path of the tubes must be studied in a way to avoid obstacles should it be necessary to extract the unit coil.
- Inlet and outlet water must consent the thermal exchange against the current. Follow instructions found on the WATER INLET and WATER OUTLET plate.
- Provide an air valve at the top of the unit, and a water discharge valve at the bottom.
- Reinforce sufficiently the units external tubes to avoid offloading the weight onto the coil.
- Once connection has been effectuated, fix the external seal flush against the control panel, in this way avoiding the passing of air.
- The insulation must not rest against the paneling, as this may provoke burning.
- For control purposes, organize the interception of the tube side coil when the fan is off, to avoid internal overheating and possible damage to internal components.

- Provide an anti-freeze system.
- Provide a cut out switch to isolate the coil from the rest of the circuit in case of extensive maintenance needs.
- Should the unit be installed in particularly cold areas, drain completely before plant shut-off long periods.



Electrical connections

Before starting any operation, insure that the general power supply has been isolated.
All the electrical connections must be protected at the source by the installer.

- Qualified personnel according to the supplied schemes must carry out the electrical connections at the control panel.
- Insure that the voltage and the frequency shown on the technical plate correspond to the connecting power supply.

Follow the connection of the unit and its accessories using adequate cabling for the power used, and respecting the country regulations. The dimensions of the cabling must be sufficient to support a voltage drop in start up phase inferior to 3% of the nominal.

- For the general power supply of the unit, and its accessories, the use of adapters, multiple plugs and extension leads is to be avoided.
- **It is the responsibility of the installer to insure that the installation of the unit is as close as possible to the mains power supply, or sufficiently close to protect the electrical parts.**
- Connect the unit to an efficient power point, using the correct screws as supplied with the unit.
- In the unit with relay board the screws of the connectors must be screwed with torx equal to 0,5 Nm

5 – SCHEMI ELETTRICI

Follow diagram attached to every unit.

6 –MANUTENZIONE ORDINARIA

BEFORE FOLLOWING ANY TYPE OF MAINTENANCE OPERATION, BE CERTAIN THAT THE UNIT MAY NOT CASUALLY OR ACCIDENTALLY BE CONNECTED TO THE ELECTRICAL MAINS SUPPLY. THERFORE IT IS NECESSARY TO SHUTDOWN THE UNIT'S POWER SUPPLY AD PRIOR TO MAINTENANCE.

- It is the responsibility of the User to carry out all types of maintenance operations.
- Only personnel previously trained and qualified may carry out maintenance operations.
- Should the unit require disassembly, hand protection is required

Maintenance is of extreme importance if the plant is to operate in a regular way and give fade-free service. Have maintenance work done by qualified and authorized personnel, according to EU Regulation 303/2008 of 2 April 2008 (and later) that requires companies and technicians that perform maintenance / repair, leakage checking and recovery / recycling gases must be certified as required by local regulations. Comply with the safety precautions given in the relative section of this manual and take all the necessary precautions. The following information is only a guide for the end user.
Maintenance keeps unit efficiency, reduce the speed of deterioration over time and collect information and data to understand the efficiency of the unit and prevent failures. We suggest to prepare a booklet of installation according European legislation. Provide a machine book that allows you to track of the actions taken on the unit, so it will be easier to cadence adequately the various interventions and will facilitate a possible troubleshooting.
Please take note of: date, type of action, description of action, measurements performed, anomalies identified, alarms registered in the alarm history, etc. ...

Monthly maintenance

Air filters

Filter section can be entered through side removable panel as well as bottom turnable panel; following the **figure 12**, in the first case, filter removal is done by dismounting the side filter frame 1, in the second case, by dismounting the bottom filter frame 2.

For the cleaning, utilize a vacuum cleaner or wash with normal detergent and warm water, allow to dry well. Remember to assemble the filter before operating the unit; replace a new filter after max 3 cleaning cycles. In case of soft bag filter (option), replace it when dirty.

Condensation discharge

Remove side panel and clean, if necessary, the dirt and impurities that have formed in the condensation tray. Also check the efficiency of the trap.

Water coil

Check that the coil exchanger (optional) is clean and in perfect state to guarantee the normal levels of performance.

Direct expansion coil

Check that the coil exchanger (optional) is clean and in perfect state to guarantee the normal levels of performance.

Yearly maintenance

Check that all the electrical equipment, in particular the fixing of the electrical connections.
Check the tightness of all nut, bolts, flanges and hydraulic connections that the vibrations of the machine may have loosened.

7 – GESTIONE ANOMALIE DI IMPIANTO

Failure searching and problem solving schedule

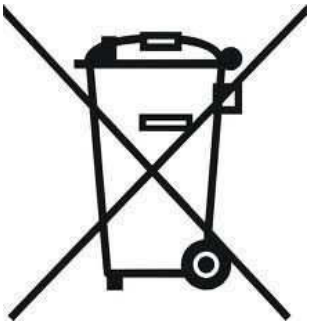
Founded failure	Probable cause	Possible solution
Fans are not running	• Power supply is switched off • No input signal to terminal 3 and/or 7 • Wrong or loose electrical connections • Motors on thermal protection mode	• Switch on the power supply • Give 0/10V signal to terminal 3 and/or 7, check GND wire is connected to terminal 4 and/or 8 • Restore the right connections • Check motor current and inverter led
Air performance decreasing	• Air filter dirty • Air duct blocked	• Clean or replace filter • Check air plant (are dampers open ?)
Condensate water stays inside the unit	• Condensate drainage blocked • Lacking or not adequate trap	• Clean or free the drainage • Install a right trap

8 – RICICLAGGIO E SMALTIMENTO

Alla fine del ciclo di vita del prodotto, l'unità ed I component devono essere smaltiti e disposti second I regolamenti interni in vigore nelo stato di installazione.

I materiali di cui l'unità è costruita sono:

- Acciaio zincato preverniciato
- Acciaio zincato
- Alluminio
- Rame
- Poliestere
- Polietilene
- Lana minerale
- Acciiao inossidabile
- Plastica



During disconnection of the unit, avoid gas leakage or liquid spillage on environment, especially if the water has additives like glycol. For dismissing and disposal, deliver the units to specialized centers according to your national laws.